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in the ground, and is easily located by its musky odor.

The seven carnivora in the Kapuas region, with the exception of one cat, one otter, and the Malay bear belong to the civet cats and the *Ichneumons*. Of the 13 rodents the squirrels are the most numerous, and among them are two very pretty species, *Sciurus melanotis* and *Sciurus whiteheadi*. In the same locality we found the giant of the squirrels, *Rheithrosciurus macrotis*, which lives on the ground and is distinguished by a large bushy tail, and which is universally distributed over Borneo, but is nowhere plentiful. We also found flying squirrels and on the Kenepai a small species of porcupine

Of the artiodactyls, the deer family has three specimens — the sembar (*Cervus equinus*), the muntjac (*Cervulus muntjac*), and the small musk deer (*Tragulus kanchil*); all are common in the Kapuas region and are caught by the natives. I have already mentioned the Rhinoceros; the remaining animal is the bearded pig (*Sus barbatus*), which lives on the shores of the Kapuas and is very numerous. His food is preferably earth worms, which are so plentiful that in poling in the mud of the river one pulls out more worms than earth. Because of his light skin and scanty hair the wild pigs appear white. In closing Herr Büttikofer calls attention to the preponderance of the arboreal animals, and states that of the 66 species found by him 52 are arboreal. "This preponderence is not found elsewhere in similar geographical conditions, either in Celebes, Africa or America; a preponderance which cannot be due to the priority of beasts of prey living upon the ground, for, as has been shown, they play no part in Borneo, and the tiger is unknown. It must be due to the forest covering of the island and to the yearly floods."

This imperfect *résumé* of Herr Büttikofer's paper will, perhaps, suffice to indicate its value to the zoologist and to suggest to the layman its romantic interest. We shall anticipate the pleasure of reading the forthcoming report which is to contain the combined results of the Borneo expedition.

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*SEMON ON THE MONOTREMES.**

AMONG the contributions to zoological literature which have appeared in the reports of Dr. Richard Semon's expedition to Australia and the Malay Archipelago, perhaps none have more popular interest than the papers by Dr. Semon himself on the habits and development of the Monotremes.

Both *Echidna* and *Ornithorhynchus* were studied. In neither of these animals is maturity attained until the end of the second year. The male *Echidna* is considerably larger than the female. In both genera the testes increase greatly in size during the breeding season, and the female *Echidna* develops a marsupium which disappears when no longer required by the young. The breeding season of *Echidna* begins late in July, and *Ornithorhynchus* commences to breed a little later, or about the middle of August. A striking ornithic character is that eggs from only the left ovary are fertilized, although the right ovary and oviduct appear to be well developed. The usual number of ova is one in *Echidna* and two in *Ornithorhynchus*. The egg is fertilized before or about the time of its entrance into the oviduct, and is at this time about four millimeters in diameter and nearly spherical, but during its sojourn in the genital passages a shell, composed of keratin, is secreted, and the egg (in *Echidna*) increases in diameter to about fifteen millimeters by absorption of uterine secretions. Both animals are oviparous, and in *Echidna*

* Zoologische Forschungsreisen in Australie und dem Malayischen Archipel. Von Dr. Richard Semon. Zweiter Band, I. Lieferung. Jena, 1894.

the single egg is transferred by the mother to the temporary marsupium, where the young are hatched, the period from fertilization to hatching being about ten weeks. *Ornithorhynchus*, being an aquatic animal, develops no marsupium, and the eggs are said to be deposited in the burrow which the animal constructs, but upon this point Semon made no observations.

Most of Semon's studies of the development were upon *Echidna*. The Monotreme egg is strictly telolecithal, resembling the eggs of Sauropsids in many points. The four-celled stage shows two vertical cleavages at right angles, the blastomeres being exactly equal. Quite early in development the blastoderm is seen to consist of a layer, one cell in thickness, except near the middle, where a few cells lie deeper. These were called hypoblast by Caldwell in 1887, but Semon regards this apparently two-layered stage as a morula, since he finds that the blastoderm later resumes the one-layered condition which he calls the blastula. In the mode of gastrulation the Monotreme egg suggests the Anamniotic type, the invagination preceding or accompanying the formation of cœnogenetic entoderm, instead of following it as in Sauropsids and Mammals generally.

Late embryos of *Echidna* show external genital knobs, which become enclosed within the cloaca before the time of hatching.

Among observations on the fœtal membranes may be mentioned the persistent union of amnion and serosa (chorion), which is very similar to the condition described in Chelonia by Mitsukuri. During the latter half of the embryonic period the body lies between the allantois on the right and the yolk-sac on the left, the two structures being, for a time, of nearly equal size. The inner walls of the allantois become adherent, obliterating its cavity, except near the middle, while the outer surface, which is very vascular, unites with the chorion and serves undoubtedly as a respiratory organ, as in Sauropsids.

Some very interesting notes on the body temperature are recorded, which show that it bears no direct relation to season, age nor temperature of the external air. Temperatures taken in the cloaca, varied from 26.5° C. to 34° C., so that the Monotremes are in a sense midway between the so-called cold-blooded and warm-blooded animals in regard to body temperature.

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NOTES ON FRENCH GEOGRAPHY.

PAYS DE BRAY.

The even skyline seen in looking across from either side of the *vallée de Bray* between Neufchatel and Bauvais, in northwestern France, is a most marked feature in the landscape. One rides over the even chalk upland to come suddenly upon the crest of an escarpment that descends steeply before him. He there looks across a lowland and sees a similar escarpment ascending upon the farther side, whose elevation above sea-level is about the same as that of the crest upon which he stands. After descending and crossing the different formations with varying structures appropriate to the half dome, cut off on the east by a series of faults which is the main structure of the Pays de Bray, he ascends the other side of the lowland and finds himself again on a Chalk upland exactly like that which he left. One at first sight might suppose that here is the uncovered base of a dome which had been baseleveled and later covered by horizontal Cretaceous beds. The exceedingly level skyline lends countenance to this view, but even a hasty inspection of the region shows that this is not the case.

The production of the even upland is subsequent to the uplift of the half-dome, which once must have risen higher than the present upland. Two reasons for this are